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UNITED STATES DEPARTMENT OF AGRICULTURE
BULLETIN No. 281
Contribution from the States Relations Service
A. C. TRUE, Director

Washington, D. C. ▼ August 12, 1915

CORRELATING AGRICULTURE WITH THE PUBLIC SCHOOL SUBJECTS IN THE NORTHERN STATES

By

C. H. LANE, Chief Specialist in Agricultural Education and
F. E. HEALD, Assistant in Agricultural Education

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INTRODUCTION.

Home projects[1] as a part of the regular instruction in elementary agriculture promise to afford the teacher a most potent means of making the subject sufficiently concrete and practical. Too often the teaching begins and ends with the assignment and recitation of lessons from the pages of a textbook. By projecting the work of the school into the home in the vital way in which home projects do, it enlists the interest of parents and becomes the means of their education in this subject, thus affecting quickly the work on the farms of the community.

The purpose of this bulletin is to suggest some ways and means by which the public-school teacher may utilize home projects in correlating agriculture and farm problems with the regular school work.

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[1] The term "home project," applied to instruction in elementary and secondary agriculture, includes each of the following requisites: (1) There must be a plan for work at home covering a season more or less extended, (2) it must be a part of the instruction in agriculture of the school, (3) there must be a problem more or less new to the pupil, (4) the parents and pupil should agree with the teacher upon the plan, (5) some competent person must supervise the home work, (6) detailed records of time, method, cost, and income must be honestly kept, and (7) a written report based on the record must be submitted to the teacher. This report may be in the form of a booklet.

NOTE.—This bulletin is prepared especially for the use of rural school teachers in the Northern States.

THE PLAN.

The term "correlation" is here used to mean nothing more nor less than leading pupils to see the relation between home life and school life, to point out the utility value of arithmetic, geography, and physiology, and to supplement reading, history, language, and spelling. Thus through home projects and correlations there will be lent to rural school agriculture a realness and concreteness that can be obtained in no other way.

It will be observed that the material is arranged according to a monthly sequence plan. Ten months' work is provided for, but in case the school term is not so long, as is generally true in rural schools, the work out of season may be dropped.

As suggested by the title of this publication, the correlation scheme is intended to be adapted to the northern, central, and western sections of the United States. Covering as it does a large territory, the work must of necessity be largely suggestive. The details, such as the statement of problems, working of subjects in language exercises, etc., should be left to the teacher. Gathering local data as a basis for the work should be entrusted in a large measure to the club members of the school.

HOW THE TEACHER MAY ORGANIZE A CLUB.

Home projects may be carried on without an organization, but if the teacher desires to form a club he should, as soon as possible after the school opens in the fall, write to the county superintendent and State leader in charge of boys' and girls' clubs at the State agricultural college for all printed matter available pertaining to club projects. When the teacher has studied the literature and has become familiar with the plans, projects, rules, etc., of clubs, a meeting for organization should be called and should include as many boys and girls of the school district as can be brought together. It would be well to invite the patrons of the school to this meeting and have the extension representative (county agent) for the county give a talk on the agricultural club requirements and work. If possible, have the county superintendent of education and the State leader in charge of club work at this meeting and ask their aid in this organization work. Near the close of the meeting, which should not be too long, a simple form of constitution and set of by-laws may be adopted, and the regular officers of the club elected at this time may include a supervisor, president, vice president, secretary, treasurer, and program committee.

As a suggestion to teachers who have not thus far taken up club work, the following general form of organization has been found satisfactory:

SUGGESTED CONSTITUTION AND BY-LAWS.[1]

CONSTITUTION.

ARTICLE I. *Name of club.*—This organization shall be known as .... School Boys' and Girls' Agricultural Club.

ART. II. *Objects of club.*—The objects of the club shall be to make farm life more attractive and farming more profitable.

ART. III. *Membership.*—Boys and girls from 10 to 18 years of age, inclusive, shall be eligible.

ART. IV. *Officers.*—The officers of this club shall be a supervisor, president, vice president, secretary, and treasurer.

ART. V. *Duties of members.*—Prescribed in the rules for club work, such as follow instructions, attend club meetings, make exhibits at the school and county fair, and keep a report of expenses, income, observations, and work.

ART. VI. *Duties of officers.*—The president shall preside at all meetings; the secretary shall keep the minutes and records of all such meetings; the treasurer must care for all funds collected and shall pay out the same only upon the written order of the president, and the vice president may act as president in the absence or disability of that officer. The teacher shall be the local leader, having the general supervision of all local club work and power of exercising authority in proper management of the club.

SEC. 1. An advisory committee shall arrange for all public contests and exhibits, the procuring and awarding of prizes, and the reporting of statistics and other information to the State organizer.

BY-LAWS.

1. The members of the club shall agree to read all reference literature bearing upon the home project. This may include literature dealing with the growing of corn, potatoes, tomatoes, chickens, pigs, etc.

2. A written plan of the work of each boy and girl must be prepared for the teacher. They must do all the work connected with the particular contest or project entered upon.

3. The amount of yield by weight and measurement of land and other results of the spring and summer work must be certified to by the contestant and attested by at least two disinterested competent witnesses preferably members of the local school board who are not relatives.

4. Every member of the club must make an exhibit at the annual school fair.

5. In estimating profits the recommendations of the State agent in charge of boys' and girls' club work will be observed. Rent of land $...., work of club members .... cents per hour, work of horses .... cents per hour each, manure $.... per two-horse wagon load.

6. No club member should be allowed to receive more than .... prizes.

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[1] The teacher should write the State agent in charge of club work at the State agricultural college for suggestions concerning the organization and conducting of a boys' and girls' agricultural club, or, in the absence of such State agent, he may write directly to the U. S. Department of Agriculture, Washington, D. C., for such assistance. The office for extension work of the U. S. Department of Agriculture in the Northern and Western States maintains a section with a leader and assistants who give their entire time to the organization and supervision of boys' and girls' club work in cooperation with the extension divisions of the agricultural colleges in practically all of the States. The State leader in club work at the agricultural college is usually, therefore, the joint employee of the U. S. Department of Agriculture and the State agricultural college and represents both institutions alike in club work. In organizing a club, therefore, through the assistance of this State leader the boys and girls are brought into and become a part of the State organization as well as of the national organization for club work and receive systematic recognition and assistance from both the State and the Nation.

7. The committee of judges for the annual school fair shall be selected by the local leader.

8. Exhibits winning prizes at the school fair should be sent to the annual county contest and even to the State contest.

9. The percentage score for a, b, c, and d is subject to change from time to time in the different States. The recommendations of the State club leaders for the Northern and Western States for 1914–15 were as follows:

	Per cent.
(a) Greatest yield per acre	30
(b) Best exhibit	20
(c) Essay and report	20
(d) Best showing of profit on investment	30
Total	100

PRIZES.

The matter of prizes is of considerable importance. While the various contests of the club members have for their primary object the assistance of the teacher and the public schools to find an easy approach, educationally, to all the interests of rural and village life and to form a connecting link between parent and teacher, farm and school, it is found that prizes can be used to advantage. An attempt should be made to offer a large number of prizes. Many small prizes are better than a few large ones. Among the prizes suggested as suitable awards in club contests for first place the following may be mentioned:

(1) Free trips and expenses paid to district and State fairs, educational institutions, summer Chautauquas, etc.

(2) Top buggy, saddle, gold watch, automobile, etc.

(3) Clear title to one or more acres of land (to encourage land ownership).

(4) Farm implements, tools, equipment, etc.

(5) Thoroughbred pigs, cattle, horses, mules, pen of chickens.

(6) Club emblems, banners, and pennants.

(7) Manual-training workbench, set of tools, camera, trunk, leather handbag, writing desk, etc.

(8) Poultry equipment, such as incubators, watering and feeding troughs, brooders, fencing, and gates.

(9) Free tuition to short courses in agricultural and mechanical colleges and regular courses in colleges.

(10) Canvas tent, camp outfit, canoe, hunting equipment, baseball suit, and suit of clothes.

(11) Dictionary, encyclopedia, set of agricultural books, special club library, series of books of standard literature.

(12) Subscriptions to farm journals, magazines, and special periodicals for boys.

School credit should be given to every member of the club who carries to completion some one club project. Every boy and girl should be taught the real meaning and value of a prize and that a realization of work well done is the true reward of effort.

HOW TO KEEP UP THE CLUB INTEREST.

The success of the rural school club depends largely upon the cooperation of the rural school teacher, county superintendent of education, extension representative (county agent), and the club leader of the State college of agriculture. Shortly after the club is organized in any rural school the teacher should submit the names of the members to the county superintendent of education, who will assist in furnishing the club with literature directing them in the work. The teacher will find it advantageous to have the extension representative (county agent) make talks before the school, as well as visit the contestants' home projects as he makes his rounds from time to time. The teacher should visit the homes of all club members and, together with the boys and girls and any other members of their families, go to the prize acres, etc., and have the owners tell the methods of preparing the soil, fertilizing, and cultivating the crop. The results of such a trip will present much material for discussion at club meetings and regular class instruction in agriculture. For every school club there should be a local committee of three men and three women who will encourage the children, interest influential members of the community in the club, and inspect from time to time the work of the club.

SCHOOL-EXHIBIT DAY.

In order to bring to a close the contest work of the boys and girls, one day of the school year should be set apart for the display of the club projects and of their other efforts. The small exhibit in the local school is of most value, and often it is possible for two or more schools to combine in having their school exhibit.

To make the school exhibit a success, not only the children but the parents must be enlisted. The social element in it is very important. Every parent must be so interested that he will feel he must be present. Plan for an entire day given to the special occasion. If there is one in the vicinity who can give anything valuable to agriculture, secure him as a speaker. If this is done, have two programs, one in the forenoon for the speaker and one in the afternoon when the children shall take the prominent place.

Have the children's program plan to show the results of the club-project work and other home efforts. Let it include the best compositions written on the more interesting phases of the work. The history of corn, the importance of corn in America, the development of breakfast foods, my experience in growing corn, my success with poultry, games that I like on the farm, why farmers should spray, value of birds to the farmer, and number of days of work needed for one man and a team to raise and harvest an acre of corn are suggested as additional subjects.

The history and work of the farmers' institute should be reported by one of the older pupils; another should give an account of what the agricultural college is doing for the State.

If sufficient interest has been aroused, contests in judging corn, breadmaking, rope tying, and seed-corn stringing might be held. For judging the exhibits prepared by the pupils secure some one who has studied corn judging, poultry judging, etc. Be sure to make this a feature of the day, making the announcement of the results a part of the program.

Music should not be omitted from the program. Some patriotic music should be included, as should the State song.

Plan to have dinner at the school and use every device possible to utilize products grown by the children. If the number of people is not too large, a splendid lesson in art would be the making of place cards and decorating them with some corn design. If these are not made, souvenirs of the day should be made by the pupils, carrying out some particular club-project idea. This is one real way to teach decorative art.

For a language lesson prepare written invitations to the patrons of the school. Perhaps the form side of notes of invitation will be more vividly taught then. Be sure to include the local editor in the list of invitations. Have a report of School Exhibit Day written by some of the pupils for the local papers.

The decoration of the schoolroom should not be neglected. Blackboard drawings, booklets, corn products, and other work of the pupils should be utilized. Use some fine specimens of corn in completing the decorations. The room should be decorated so as to give joy and impress the thought that the man who tills the soil is engaged in an exalted work.

SEPTEMBER.

Practical and field exercises.—Select seed corn in the field and have a schoolroom demonstration of methods of curing. (See Correlation Supplements II and III on pp. 26, 27.) Cooperate in the canning of surplus tomatoes. Arrange that each pupil shall report on the local or county fair visited, and it is well for the teacher to attend with the pupils. Take a field trip to collect seeds, weeds, insects, and other illustrative material. (See Farmers' Buls. 586 and 606.) Observe the condition of fields; recognize and destroy weeds. Visit the project fields of pupils when possible on these excursions. (See score card on corn in Supplement XIV.) Prepare to hold a school exhibit or fair. (Refer to Supplement I.) Have pupils exhibit some of their produce at the county fair. (Fig. 1.)

Language lessons.—Have all pupils use notebooks when doing field work. Utilize the club-work material for both oral and written descriptions. Have the summer experiences written up fully for each club project, not as a language lesson first, but for its content, and then revise. Have the pupils write and mail requests for bulletins needed, also for periodicals and catalogues. Have written such parts of the report on project work as are due at this time. Do a part of the work on the booklet to correspond with the field progress. (See Supplement on Booklets, No. VIII.)

Reading and spelling.—Use those selections in the supplementary reading books which are rural in their bearing and which are seasonal. Utilize also the best selections available in other books. The teacher may well read some of these for the entire school. Among those possible for September will be found Maize—Fosdick; The Legend of Maize (in Hiawatha)—Longfellow; Eyes and No Eyes—Kingsley; Happy the Man—Pope; To a Waterfowl—Bryant; Evening at the Farm—Trowbridge; Bobwhite—Cooper. Memorize the Country Boy's Creed, by E. O. Grover.

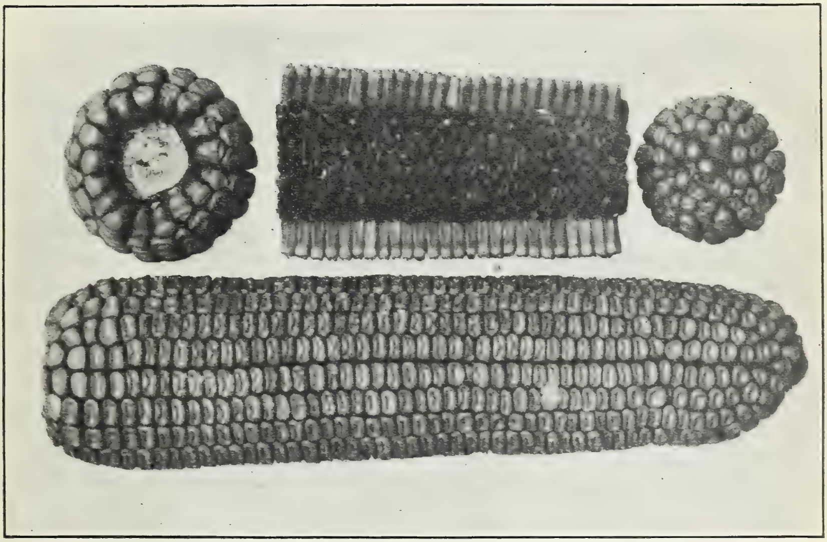

FIG. 1.—Desirable ear of corn. Selected by the Division of Corn Investigations, Bureau of Plant Industry.

Of a more strictly agricultural nature select those periodicals and bulletins which deal with the local conditions and the club activities of the pupils. Farmers' Bulletins which may be needed include Nos. 229, The Production of Good Seed Corn; 415, Seed Corn; 537, How to Grow an Acre of Corn; 578, The Making and Feeding of Silage; 617, School Lessons on Corn.

Add to the regular spelling lists all the new words which appear in the agricultural reading and especially those which are misspelled in the written exercises. Make sure that the terms are all pronounced correctly. Mispronunciation makes misspelling almost inevitable, and the pupils should use the proper term in each case.

Arithmetic.—The summer records of the projects ought to furnish the figures for problems of all sorts. Areas of fields, stand of corn, averages of yields, rate per acre, cost per acre, increase of yield over seed, gain over cost in amount and rate, interest rate on investment, rate of yield in relation to average for State, cost per egg of producing eggs, tomato incomes and net profit, probable per cent profit from the canned tomatoes, are some of the possible problems. The capacity of silos is a problem suited to some districts. Have the problem relate to the class work of the month or to review work in arithmetic as well as to agriculture. The correlation should work both ways or it is unfair. Remember other phases of community and home life deserve correlation. (See problems in Supplement XIII.)

Geography.—Have pupils make several copies of maps of the district and the township. Get original maps from county or township surveys or make from observations of district. On one locate the winners of prizes on different exhibits at the fairs. This will help in finding suitable material on field trips. Have pupils obtain data as to earliest severe frosts for the section and compare with other sections. On the State map locate the chief crops of various sections, also make note of particularly successful boys' and girls' clubs. Note what crops are yielding well in the different States and discuss climatic factors. (See the latest issue of The Monthly Crop Report.[1]) Apply the same method to international crops, commerce, etc., making use not only of census and other statistics but also the current information gained from magazines and farm papers. Make comment on the crop per acre at home and abroad and seek explanations.

History.—Consider the agricultural, industrial, and social facts connected with the period in history which a class is studying. Look up in various history texts the story of corn in the United States, also have pupils inquire into the farm history of your section. (See Bowman and Crosley's "Corn," Ch. I, and Montgomery's "The Corn Crops," Chs. I and II.) Trace the history of the potato in reference books and readers. Do not destroy the plan for history lessons but adapt topics to this plan. Where local histories are not printed, both tradition and scrap files of old newspapers will be helpful.

The suggestions under both history and geography are intended for the reading and inquiry by the pupils, to be followed by classroom discussion. These topics may be divided among the members of the class. Many school-history texts have separate chapters on agricultural, industrial, and social development, and others take up these matters as a part of each epoch. Nearly every modern geography devotes much space to soils, crops, animals, the food supply, and farming as an industry. The public library usually has many helpful reference books on travel, invention, industries, as well as histories and geographies. The supplementary geographical readers and texts in history, physical geography, etc., loaned by the nearby high school will give ample reference texts. Sample copies of textbooks are usually found at the school. Personal inquiry will discover other sources of information.

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[1] The Monthly Crop Report is issued at monthly intervals by the United States Department of Agriculture and gives surveys of agricultural conditions in the country and other timely information which should help any rural-school teacher.

Drawing.—Sketching, design, and color work may include corn subjects, weeds, fruit, and insects. Working drawings of any apparatus used in school or at home in connection with the month's lesson may be needed.

Physiology.—Food values of crops raised locally is a timely topic. See Farmers' Bul. 121, legumes; 142, general; 295, potatoes; 298, corn; 359 and 521, on canning; 375, care in home; 565, corn meal. Plant food and animal food as related to current physiology lessons should be considered. (See Brewer's Rural Hygiene, especially on local problems of fall sanitation.)

Manual training.—Make corn-drying racks, exhibit shelves and window boxes. Can tomatoes and other vegetables and fruit. Braid husk mats and baskets. Take up tender plants into pots and boxes.

OCTOBER.

Practical exercises and field trips.—Visit a contest area, measure the plat, weigh and judge the crop. Keep data for future problems. Visit flocks of high-grade poultry, especially flocks with good records for laying. Gather soils and store away in boxes or pails for future lessons on soils and for germination plats or shallow boxes in early spring. Help club members close up their projects ready for a report. Examine modern harvesting machinery while on trips. Have members store garden produce, take up tender bulbs and roots, destroy weeds and rubbish which may harbor insects or disease. Select laying flock of poultry and begin fattening for market the fowls which are not desired for laying. Club members who now plan to raise crops next year will do well to plow land this month. (Fig. 2.)

Hold the school fair this month if it was not held in September. (See Supplement I.) Much of the practical work of this month will be done by the pupils at home. Teachers should consult Farmers' Bul. 562, The Organization of Boys' and Girls' Poultry Clubs.

Language lessons.—Write out with care the reports on the club contests or project work just completed. Complete the booklet for corn, potatoes, tomatoes, and other projects. Make out new applications for club projects soon to begin. Write a description of the school fair for the local newspapers. Conversations in which pupils tell without interruption about some process, trip, or other experience should alternate with written exercises.

Have members of the class write formal invitations to adults requesting them to attend the school fair. Send requests for bulletins, score cards, and other material needed soon.

Reading and spelling.—Read inspirational and seasonal supplementary selections, as: The Farmers Gold—Edward Everett; Black Beauty—Sewall; The Corn Song—Whittier; The Apple—Burroughs; The Horse Fair—Baldwin; Hiawatha's Brothers—Longfellow.

Readings in practical agriculture may be found in Farmers' Buls. 51, Standard Varieties of Chickens; 287, Poultry Management; 313, Harvesting and Storing Corn; 574, Poultry House Construction.

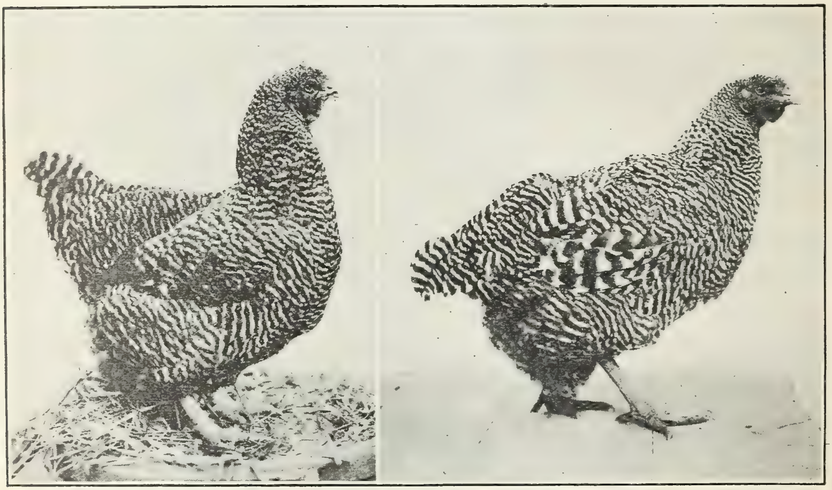

FIG. 2.—Evidences of strong and weak constitutions. Selected by Animal Husbandry Division, Bureau of Animal Industry.

Also use State bulletins and periodicals on suitable topics. Drill on words misspelled in written exercises and on new words in reading.

Arithmetic.—Make out with accuracy and neatness statements of cost and income to accompany the report on the club work. Rule columns with care and make figures plain. Compute and order bill of lumber needed for new poultry house or for remodeling, for nests or other equipment. From the figures obtained from various crops assign problems adapted to the advancement of the pupils.

Geography.—Complete a local survey of the crops and the poultry flocks of the district. Record this both on maps and on tabular charts. Have pupils look up the extent of the trade in farm produce for the State, at what points sold eventually. Find also the origin of grain and other farm produce imported from without the State.

Refer to such texts as Hunt's "Cereals in America." Have pupils make an outline map of the county and locate thereon the chief crops either by sketches or by grains, etc., glued on the map. This map will be useful in teaching younger pupils. Have a large map of the district made to be duplicated for future surveys. (See Supplement VII.)

History.—Have pupils inquire into the history of grain and fruit development in this country, especially the crops now grown in club work. Note the effect of the crops and the methods of raising them on the history of this country and the great national issues. As examples, notice cotton and tobacco in the South, grain and meat in Central States, dairying and diversified farming in New England. Trace the effect of the growth of cities on the type of agriculture in different sections, especially in supplying milk, garden truck, etc. Show how the free grant of rich lands led to careless farming because it was supposed their fertility was inexhaustible. Trace the growth of the work of the National Government and the State Government in encouraging good farming and in controlling pests and diseases. It is not to be expected that one class will develop all these topics. Select those adapted to the section and to the available reference books. Review the history of the development of harvesting machinery in the United States.

Drawing.—Make cover design for booklets. (See Supplement VIII). Make other drawings or sketches needed to complete the booklets. Use fruit, grain, and vegetables for studies in sketching, color work, and designing. Have working drawings made for new poultry house and equipment, for improved shipping and storage apparatus. Make specifications and bill of lumber for each from these drawings in arithmetic class work.

Physiology.—Take up poultry and eggs as human food. See Farmers' Buls. 128, Eggs and Their Uses as Food, and 182, Poultry as Food. Consider the feeding value and digestibility for farm animals of the crops harvested and stored from the club acre. Apply the lessons used in human physiology concerning foods and digestion. See Farmers' Buls. 22, The Feeding of Farm Animals, and 142, The Nutritive Value of Food.

Manual training.—Construct a model poultry house on a small scale. Have as many pupils as possible plan to construct poultry houses for their club flocks. Make full-sized nests and feed boxes. (See Farmers' Bul. 638.) Have the girls learn to cook and serve vegetables and fruits, also to can them and to preserve them in other ways. (See Farmers' Buls. 359 and 607.) Have them prepare and serve a variety of dishes from some of the produce of the projects and show these dishes at the exhibit. Have the mechanical work on the booklet done with care.

NOVEMBER.

Practical and field exercises.—Visit storage plants for farm produce if there are any in the section. Visit farms where the class may inspect pure-bred poultry, cows and other animals. Observe also the best methods of housing. Visit a club member's poultry house. If any orchard work is done in the district this month have reports made on this work. Pruning and scraping must be done before spraying with lime-sulphur for San José scale. (See Farmers' Buls. 181 and 492.) This may be done at any time after the trees become dormant except during freezing weather. Have apple-club members inspect for the scale, and if present it should be treated at once. Apple packing for market may be in order in some sections. Have poultry houses cleaned, repaired, and sprayed this month. Rubbish must be destroyed and vines and shrubs protected from the cold. Certain trees and shrubs may be set out now. Cuttings made during pruning of grape vines and many shrubs may be preserved in sand until spring. (See Farmers' Buls. 157 and 471.) The teachers should advise club members to do these things. Complete the collection of soils, seeds, etc., for winter use.

Language lessons.—Have reports on field trips written with care and when they are on the topic of the projects, incorporate them in the booklets. Likewise, include descriptions of structures or operations observed or used. Have oral discussions along the lines suggested in the practical exercises, trying to obtain from the pupils clear descriptions in good English.

Send letters to obtain bulletins, catalogues, tools, etc. Have the class edit a school newspaper (not printed) dealing with the affairs of the school and the club work of the district. Have this read in school and send articles of merit to the local press. Thanksgiving suggests many seasonal topics and is emphatically a rural festival.

Reading and spelling.—Include in the supplementary reading selections like Walden Pond—Thoreau; November Woods—H. H. Jackson; Farming—Emerson's Essays; The Twenty-third Psalm; Descriptions from Audubon's Writings; November—Alice Carey. Look up the story of Johnny Apple-seed in Hillis' "The Quest of John Chapman."

Continue reading in bulletins suggested for October and add Farmers' Buls. 154, The Home Fruit Garden; 491, The Small Apple Orchard; 492, Enemies of the Apple; 528, Hints to Poultry Raisers; 562, Boys' and Girls' Poultry Clubs. Also use State publications from all sources and farm papers on related topics.

Keep a list of words posted which shall include agricultural terms used in the reading texts, also words which have been misspelled or mispronounced. Have spelling exercises, both written and oral, on these lists and prepare for a public contest in connection with some neighborhood event.

Arithmetic.—Problems in corn shrinkage, marketing corn and the relative merits of feeding and marketing corn may be made from figures given in bulletins and textbooks. Select also figures concerning cost of harvesting and marketing apples, potatoes, and other crops. Compute net profits on club acres. Compute rations and cost of each for poultry and any other animals which are in home projects. Consult text and bulletins including Farmers' Bul. 22. Continue computations of material and cost of constructing poultry houses and equipment. Compute cost of feeding club flocks, egg production per hen and cost per egg or per dozen eggs. Use current market prices where eggs are used at home. Compute rate of interest on investment. (See also textbooks on Farm Arithmetic.)

Geography.—Look up climatic factors of different crops; limits in latitude, altitude, etc., for different plants. Find where the tender plants grow native, also the northern limits of the hardy plants. Find in bulletins and books on insects the origin of the orchard pests of the section. On maps and tabular charts indicate the results of the survey of the poultry of the district. Keep club members' records separately. Make a graphic representation to show the relation in numbers of pure-bred fowls to scrubs by lines with lengths in correct proportions. Put on map the roads used for market, social, and civic purposes and indicate parts needing repair.

History.—Have pupils find out where the different varieties of poultry originated and trace their introduction. Numerous poultry books give this information. Look up stories of fowls in history, as The Geese that Saved Rome. Inquire into the introduction of fruits into the section and how they have been improved. In like manner trace the history of methods of marketing the local produce. What effect have the transportation facilities had on the development of the county and State? Many texts in geography and history give this. Find how different European countries have affected American agriculture by furnishing live stock, plants, methods, and labor. Trace the history of Thanksgiving celebrations.

Drawing.—Make Thanksgiving sketches and designs. Sketch typical poultry. Make a series of colored drawings of varieties of apples. Make working drawings of any equipment needed this month. Have members of Good Roads Club make sectional drawings of good and poor roads in the district. See Farmers' Buls. 338, 505, and 597. Have pupils make a series of sketches of historical modes of transportation for the section, such as ox cart, prairie schooner, flatboat, not omitting the modern.

Physiology.—The topic of breathing leads to ventilation and exercise. Correlate the idea of human needs with the plan for making poultry pens light, well-ventilated and with ample room for exercise. The same idea must be applied to stables for dairy cows. How guard against vermin in the flock? Show how the food demand changes as winter comes. Suggest succulent winter foods for poultry and dairy.

Develop the topic of apples and other fruit for human food. Consult Farmers' Bul. 293, Use of Fruit as Food. Compare eggs and milk with other animal foods for cost and food value. Demonstrate the variety in supply of fresh foods on the farm. (See Farmers' Bul. 635.)

DECEMBER.

Practical and field exercises.—Plan to have pupils visit successful dairy farms to inspect typical animals and learn of points. Investigate also the management, the feed practice, and marketing.

Begin practice in milk testing at school if possible. Begin practice in corn judging. Examine soils in school collection and distinguish by appearance and feeling sand, clay, gravel, and humus.

Make a record of winter birds, when and where seen, what food and other habits. (See Farmers' Buls. 54, 456, 497, 506, 609, 621, and 630.) Strive to observe accurately. Use Birds in Their Relation to Man, by Weed and Dearborn, or similar books.

Language lessons.—Have report of dairy inspection carefully written. Require descriptions of an ideal ear of corn or of the best cow on the home farm. Write with care the plan for selecting a suitable ration for either the hens or the dairy cow. Write the directions for testing milk with Babcock tester. Make out with care reports or records on work done or observations made. Keep these for reference. Careful figures, plain writing, correct spelling, and clear statements are necessary on all club reports and often win the contest.

Reading and spelling.—Select supplementary readings giving an appreciation of the freedom, security, and happiness in the country in winter, such as Snow Bound—Whittier; Our Rural Divinity—Burroughs; The Winter herd scene in "Shovelhorns"—Hawkes; Wood-craft—Boy Scout's Manual; and Stories of Luther Burbank's work. Memorize The Boys That Rule the World and other poems.

Along the lines of suggested practical exercises read from available bulletins. Consult poultry bulletins previously mentioned, also Farmers' Buls. 413, Care of Milk and Its Use in the Home; 490, Bacteria in Milk; 530, Important Poultry Diseases; 602, Production of Clean Milk. If there is not published in the State a bulletin on the Babcock test one may be procured from another State or from manufacturers of testing machines.

Pupils should be encouraged to use the scientific terms in many cases, in which event they should learn to spell them. Use common terms when accurate, however.

Arithmetic.—Milk records, computing rations, butter-fat computations, poultry cost and income problems will furnish much of the practice needed. While judging corn, determine what increase per acre would result if one more average kernel per row would develop on each ear. From some of the records of insects and weed seeds eaten by the winter birds make up problems as to the possible saving to the farmer. Use also crop statistics in census report or the Yearbook of the Department of Agriculture, usually to be found in township or private libraries. Have pupils count the number of average ears in a bushel of corn raised in the district. Shell and weigh again. Have problems computed on this basis. Weigh 100 or 1,000 kernels and estimate number per bushel. Borrow scales or weigh at home.

Geography.—Locate on the township map the industries in the township and county which may be related to farming, as the gristmill, the sawmill, grain elevator, tobacco-sorting shops, broom shops, tannery, creameries, and cheese factories. Trace also the local and more distant markets for eggs, butter, milk, cream, fruit, and vegetables. How many dealers between the farmer and the consumer. Look up the range of the birds which are winter residents. Make a list of important climatic records, such as dates of early snows, highest summer temperature, lowest winter record, depth of freezing of the ground, etc. Compare with other parts of the State and the Nation, drawing conclusions as to how the local agriculture is affected. Make a district survey of dairy cattle, including number on each farm, breeds, pure bred or scrubs, silos, sanitation, records kept, testing for butter fat, and feeding methods for each farm. (See Survey Form in Supplement VII.) Use both map and chart methods. Keep figures for arithmetic.

History.—Write to a dairy association for information about the history of dairying for the State, the story of modern scientific dairying, the Babcock test, the separator and clean milk. Trace the prodigal farming methods of the past and show how these must be modified in the near future. Find what great Americans have been reared on the farms. Show how the farmer must have great influence in the affairs of the Nation, also the necessity of his being well informed and broadly educated. Find the effect of seed selection and milk testing in sections which have tried them.

Drawing.—Have careful drawings made of ideal ears and kernels of corn. Working drawings or sections should be prepared while the milk tester is being explained and used. Have pupils make a sectional drawing of the separator in common use in the district showing working parts in place. Sketch the typical dairy cow and enlarge this to make a chart for class use in studying the points of the dairy cow. Sketch winter birds and winter scenes on the farm. Make plans for any constructive work at home. (Fig. 3.)

Physiology.—Apply to the care of hens and cows and other animals the principles learned in physiology concerning winter exercises, ventilation, exposure, etc. Show that undue protection renders any animal less resistant and when ventilation is limited at the same time colds and germ diseases are more easily contracted. Reasonably low temperature is to be feared less than poor ventilation. Show the value of vigorous exercise in the winter sports and work. Compare the habits formed by boys in doing chores with the training of farm animals. Take up now the part of the text on emergencies so far as they relate to winter conditions.

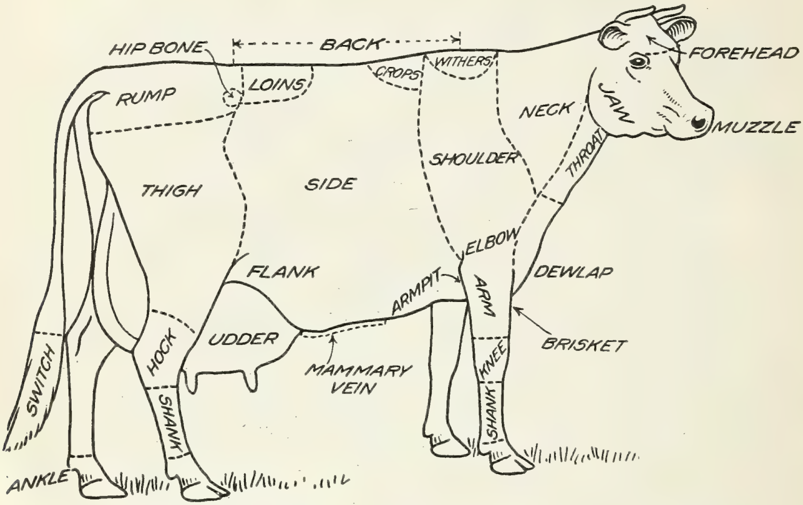

FIG. 3.—Chart of the ideal dairy cow. Approved by the Dairy Division, Bureau of Animal Industry.

Manual training.—The practical exercises for this month suggest all the needed manual training related to agriculture. (See Farmers' Bul. 638.)

JANUARY.

Practical and field exercises.—Continue the work in milk testing and corn judging until some skill is attained. Those who are to hatch chickens should now separate with care the breeding fowls and give them ample room and suitable food. The testing of eggs and care of the market eggs are important from now on. (See Farmers' Bul. 562.) Each pupil should decide on what club work or home projects he is to take up during the coming season.

If it is advantageous in your district to haul the fertilizer in winter, take up that matter with each club member. Visit local factories and warehouses which deal with agricultural material of any sort.

Language lessons.—Stories of winter operations, trips, and pleasures offer much opportunity for oral and written language work. The snow and ice quicken local industries and provide new sports. Letters to obtain seed catalogues should be written this month. The pupils of this group should write about feeding cows or poultry, winter birds in the orchard, also reports on trips and observations. Write for State and Federal publications on the topics related to the club work of the coming spring.

Reading and spelling.—Use supplementary readings which are seasonal. Selections suggested as samples are Winter Time—Stevenson; Essay on Roast Pig—Lamb; The Forest Song—Venable; Winter—Lowell; Woodman, Spare That Tree—Morris; The Home Song—Longfellow.

Also select readings from Farmers' Buls. 173 and 358, A Primer of Forestry, in two parts; 363, The Use of Milk as Food; 594, Shipping Eggs by Parcel Post.

Misspelling, mispronunciation, and misuse of agricultural terms often arise from the same cause. Teach the spelling, pronunciation, and proper use of each word used and drill until the pupils acquire confidence in using them.

Arithmetic.—Use the records from milk testing combined with records of milk production and compute total yield of butter fat, money value, and estimated profit. Where feed records are available, obtain exact profit over cost of feed. Make similar computations from egg records and poultry feed accounts. Consult census or Yearbook records for comparison with local productions and also for further problems. Compute fertilizer needed on club fields and gardens. Find the volume and capacity in tons of ice houses. Measure logs, lumber, and woodpiles, and base problems on these figures. Use local prices and compute value of each. Have each club member keep accurate accounts. (See Farmers' Bul. 572.)

Geography.—Look up the origin and present source of various fertilizer ingredients, and consider which ones might be replaced by better farm practice. Compare dairy records of the State and various other States and nations as printed in farm papers. Have maps made of the home farms, and on them locate the pupils' own fields and each of the crops for the coming season as fast as they are decided. Locate by color or shading the different soils. The United States Department of Agriculture has issued soil surveys of many counties and some States have issued others. Obtain one for the county, if possible. Study the lumber industry of the section and the State, national forestry work, kinds of native woods, and imported lumber. What part does ice take in modern dairy farming? In storing and transporting produce? How does the South get its ice?

History.—Trace the development of the lumber industry in the State; the growth of the movement against deforestation and related conservation movements. The State forester has probably issued helpful information. Explain why early wasteful methods were used. Refer to great historical forests. Inquire into the history of the section regarding fertilizers and concentrated feedstuffs. What crops are now sold to buy these, and does it pay? Look up in State and local histories and stories the winter experiences of pioneer days and find how self-supporting the farm was. What modern methods are improvements? Are any of them the reverse?

Drawing.—Sketch farm animals which are involved in pupils' projects? Winter tree forms make good studies and lead to a better acquaintance with the trees of the district. Arrange these for future reference. Have some pupils sketch the tools used in some of the work inspected this month, as lumbering or ice-cutting tools.

Physiology.—Delvelop the following topics: Diseases and emergencies which are more common at this season; tuberculosis as a preventable disease; milk from tuberculous cows; milk and cream as absorbents and carriers of disease; prevention of epidemics; the laws of the State and the local health board rules. See Farmers' Buls. 363, The Use of Milk as Food; 473, Tuberculosis; 490, Bacteria in Milk; 602, The Production of Clean Milk.

Manual training.—Make egg testers and corn-testing apparatus ready for next month. Make models of stables, poultry houses, and sleeping rooms arranged for proper ventilation. Have girls cook and serve various apple dishes. Make bird houses. (See Farmers' Buls. 609 and 621.)

FEBRUARY.

Practical and field exercises.—Make definite plans for garden and other projects, taking up details. Order seeds needed in a quantity sufficient to allow testing. Make tests of corn and other seed at school, illustrating different methods of testing. (See Farmers' Buls. 428 and 617.) Have pupils continue this testing at home and ask them to report on this home testing. Make a study of the seedlings, referring to textbooks in botany. To obtain very early plants, sow seeds this month in hotbeds or window boxes. Continue testing eggs for marketing and ask pupils to practice this at home. It pays. Visit a creamery or other local establishment where eggs are tested and shipped. Hold a special public demonstration of the ability of the class to test milk, judge corn, test seeds for germination, etc.

This is a good time to hold a public spelling contest. Observe the bird movements which begin soon and keep a bird calendar. (Fig. 4.)

Language lessons.—Supervise the writing and sending of seed orders. Have the pupils write out their records and reports with care, making clearness of statement the first aim. Have copies made of some of the best reports and keep them with the files of agricultural literature. Have members of the class write invitations to adults requesting them to attend the contests. Have careful reports made of each new process taken up. Write letters to request new bulletins for spring work.

Reading and spelling.—Suggested supplementary readings include Happy the Man—Pope; The Home Song—Longfellow; The Arab to His Steed—Caroline Norton; To a Mouse—Burns; Stories of Morrill, Seaman Knapp, and of other men who have assisted agricultural education in the Nation or the State. Read some of the most recent laws on this subject. Also use in class Farmers' Buls. 218, The School Garden; 255, The Home Vegetable Garden; 445, Marketing Eggs Through the Creamery; 528, Hints to Poultry Raisers. Pay special attention to the spelling of words used in the correspondence and reports sent out. Hold spelling contest and use all the farm words possible.

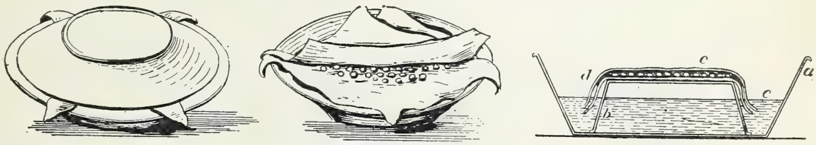

FIG. 4.—Germinating devices for garden seeds.

Arithmetic.—Practice making invoices, checks, receipts, and other commercial forms involved in farm business. Compute garden areas and lay out to scale the space for each variety of vegetable. Use problems based on egg sales, cost of marketing, and net income. Use the figures obtained in milk testing, compute value of butter fat per hundredweight of milk and total value of milk if 30 cents per hundredweight is allowed for skimmed milk. Get the milk records of some of these cows and compute total income. If possible, get feed records and combine these with the other problems.

Geography.—Add a district survey map covering the practice in seed testing, also in raising good seed. Have pupils look up the origin of the various seeds used in the district for garden and field crops. Should more seed be raised at home? Which of these crops grow wild in milder climates? Which garden crops would it pay to raise for near-by markets? Investigate the demand and the supply of these things which the club members of the class plan to raise. Carry this investigation to cities as far distant as shipment could be made.

What unfavorable conditions of soil or climate may prevent the success of some club projects?

History.—Have pupils look up (in reference books at home or in the library) the original home and the historical place of each of the crops to be raised in club or project work, recording the native land and the date when each became available for human food. Trace also the modern improvement. How are new vegetables brought into use? How many have been domesticated during the last century? What vegetables popular elsewhere are never raised here? Why?

Drawing.—A series of drawings to show the development of the germinating bean (or other seed) may be carried up to the opening of the true leaves. Make working drawings and bill for material for seed testers and seeding flats or shallow boxes. Make plan and pattern for an egg tester, also plans for suitable shipping cases for eggs. Draw school and home gardens to scale.

Physiology.—Study the State and local laws covering all matters of sanitation and discover what needs are not covered by legislation. Water supply, sewage, infectious diseases, clean milk, and other laws are included. Is the rural section as well protected by legislation as the city? What laws are there for the protection of the people from injury? Compare the different methods of heating homes in the section as regards effectiveness of heating and opportunity for ventilation. Criticise the school heating and ventilation. Use manuals issued by the State department of public instruction, also bulletins of the board of health.

Manual training.—Make seed testers and egg testers. Make window boxes and seed "flats," which is the common name for shallow boxes for starting seeds. Make model of hotbed or cold frames.

MARCH.

Practical and field exercises.—Prepare for incubation. Pupils should consider local climate, also their own facilities for indoor brooding before deciding on date for setting. Visit successful poultry plant to observe incubator practice. (See Farmers' Buls. 585 and 624.) Have a demonstration of how to preserve eggs. (See Farmers' Bul. 128.) Cold frames, if not already in use, must be prepared for seeds. Consult gardener's planting table. (See Farmers' Bul. 255, p. 46.) Start early plants of lettuce, tomatoes, asters, pansies, etc., under glass or in shallow boxes to be placed in windows. Have field demonstrations of grafting, pruning, and spraying as soon as the work can be done comfortably. Request the county extension representative of the State college to assist you in this. Set out fruit trees as early as the ground can be fitted. (For apple-club members.)

Language lessons.—Have prepared and mailed any necessary letters concerning club membership, seeds, fertilizers, or tools. Have pupils write a full report when they set a hen or start the incubator. Write and preserve reports of each field trip or demonstration, with full description of processes. Have either written or oral descriptions of work planned for the immediate future.

Reading and spelling.—Read some rural life selections like the following: The Homes of the People—Grady; The Plowman—Holmes; The Meadow Lark—Hamlin; Bluebird—Aldrich; Tubal Cain—Mackay; Out at Old Aunt Mary's—Riley; The Parable of the Sower—Bible. Use also bulletins and periodicals on the topics of current interest. Some Farmers' Bulletins of seasonal use (besides those previously referred to) are Nos. 516, The Production of Maple Sirup and Sugar; 585, Incubation of Hen's Eggs. Also consult the list of bulletins for those which concern special garden vegetables.

Arithmetic.—Material for problems will be found in poultry records, bills for seed, fertilizer and tools, cold-frame construction, orchard work, and dairy projects. The maple-sugar section has problems peculiar.to that work. Develop the topic of taxation in the section, the method of assessing and its bearing on farm management. Find what correction of figures submitted with club projects might be needed to apply them to farm accounts in view of taxes, interest, and other fixed charges in the district and to show exact profit.

Geography.—Study the advantages and disadvantages of local climate in relation to early spring work on the farm. On a map draw lines to show the market radius for different local products. Use ink of another color and indicate sources of local purchases for farm supplies, especially those which might be produced locally. On the State map locate cooperative associations of farmers as creameries, breeders' associations, etc. Obtain information as to late spring frosts, safe dates for planting, transplanting, etc.

History.—Discuss the following topics in class after pupils have used reference books, local histories, and other texts: (1) Food supply and progress. The influence of transportation facilities. Such books as Brigham's From Trail to Railway Through the Appalachians, are helpful. (2) Local food supply and markets during early history. (3) The crops and industries as influencing the attitude of different States on great national issues. (4) Americans have invented and developed much machinery for raising and utilizing farm crops. Why? What machines? There are numerous books on inventions including such as Forman's Stories of Useful Inventions. Observe how man power is giving way to machine power in America faster than in Europe.

Drawing.—Use such sketching material as seedlings, bursting buds, a sugar camp, or some utensils. Draw tools used in grafting and pruning. Make diagrams for cold frame, trap nest, brood nest, or incubator. Have pupils draw those things they are about to use in club work or prepare careful drawings for booklet.

Physiology.—In connection with the plans for gardens and other projects take up the subject of foods and the desirability of variety of vegetable and fruit foods. Show how the action of digestive ferments renders available the starch in a germinating seed just as digestive fluids act in animals. Chapters on "germination" in botany explain this.

Start spring sanitary campaign to clean out cellars, dispose of rubbish, clean up and drain breeding places for flies and mosquitoes. See Farmers' Buls. 444, Remedies and Preventives Against Mosquitoes, p. 9; 459, House Flies; 535, Sugar and its Use as Food.

Manual training.—Make brood nests, "broody" coops, transplanting boxes, wooden garden labels. Repair cold frames and other equipment. Make suitable sample crates for shipping eggs sold by club members of the class.

APRIL.

Practical and field exercises.—Have suitable trips or demonstrations to illustrate methods of hatching and early brooding of chickens, also how to "break up" broody hens. Demonstrate transplanting of tomatoes and other plants started in the cold frames. Have the plowing and harrowing done for the club fields, except for late crops. Have a garden and crops survey of the district. Keep record of the returning birds, their habits and food. Plan and begin work on the improvement of the school grounds. Have pupils prepare bird houses. Plant out fruit trees, also shade trees around the home or the schoolhouse. Plan for next fall's exhibit before crops are planted.

Language lessons.—Continue written reports. Make records of all processes on the club work and any other projects. Such topics as the early care of chickens, starting my tomato plants, the birds about my home, are good topics. A tree-planting exercise gives rise to suitable language work. Have pupils write about the needs of the district and the possible remedies in view of the studies made. Strive for good conversational as well as written English.

Reading and spelling.—Select suitable readings, as That Calf—Alice Carey; The Barefoot Boy—Whittier; South Wind and Sun—Riley; The Song of the Sower—Bryant; April—H. H. Jackson; In the Heart of a Seed—Brown; The Bluebird—Emily Miller; Solomon and the Bees—Saxe.

Farmers' Buls. 154, The Home Fruit Garden; 195, Annual Flowering Plants; 287, Poultry Management; 537, Growing an Acre of Corn; 585, Incubation; 594, Shipping Eggs by Parcel Post; 597, The Road Drag and How It is Used; 609, Bird Houses and How to Make Them; 617, School Lessons on Corn; 624, Natural and Artificial Brooding of

Chickens; State bulletins and current articles should be used. Expect the most advanced pupils to be able to spell all the words appearing in the agricultural reading.

Arithmetic.—Have computations made in reference to the survey of the district, total areas for each crop, fertilizer used, expected crop at average yield, etc. Problems may be made based on observation of the birds and estimate of insect damage prevented by them. Use statistics for the State for crops in which the class is interested and arrange problems suited to the advancement of the pupils. Continue to use poultry, feed, and milk records, and especially the actual experiences on the home farms of the pupils.

Geography.—Have pupils search in newspapers and by personal inquiry locate the supply of eggs and poultry for the nearest large market. Determine the market radius of the local surplus. Locate on the map the chief producing areas and the large markets for tomato plants, ripe tomatoes, canned tomatoes, and other produce in which the class is interested. (See the latest Monthly Crop Report.) What sections market superior produce in these lines? What would be necessary to make the local produce as good? Would it pay to attempt to compete with the best on the market? Locate on district map each club member, using colored seals for different clubs.

History.—Develop the history of legislation intended to assist and encourage agricultural education, beginning with the Morrill Act in national legislation. (See the Circular on Federal Legislation relating to these topics, from the Office of Experiment Stations, United States Department of Agriculture.) Bring this study down to the present and show how State and Nation attempt to instruct in agriculture in schools and colleges and also on the farms. Show all the forces which are cooperating to help educate the young farmer and to assist him in other ways. Compare the history of the diminishing number of birds with that of increased loss from insect pests. Look up statistics on this topic.

Drawing.—Illustrate methods of transplanting small plants and fruit trees. Make working drawings of bird houses, garden markers, and other equipment to be constructed now or soon. Use actual club-work material.

Physiology.—Start a sanitary survey of the district. Include water supply, sewage disposal, fly and mosquito control, and other points in home sanitation. Include also the care of milk and food supply, the condition of the dairy, tuberculin testing, etc.

Have one lesson on the interrelation of plants and animals as regards oxygen and carbon dioxid, also in the utilizing of foods. Continue fly and mosquito topics.

Manual training.—Make bird houses, garden markers, and transplanting trays. Repair tools, trellises, and other things at the school.

Set out a tree on Arbor Day and construct a trellis to protect it. Make broody coop. Members of the Good Roads Club may make a road drag and begin to use it this month. (See Farmers' Buls. 597 and 638.)

MAY AND JUNE.

Practical and field exercises.—In apple-blossom time visit orchards to observe spraying for the codling moth. Complete planting and transplanting of all club crops and school gardens. Have practical demonstrations of methods of cultivating crops and of insect control. Arrange these with practical farmers. Continue the observation of birds in their relation to farm crops. Have demonstration of early feeding and summer care of chicks.

Language lessons.—Have pupils write reports on the planting and other early work on their projects. Write out also the reports on field trips and observations. Write a statement of things to be done during the summer, especially those processes which are new to the pupil. Have oral discussion of similar topics.

Reading and spelling.—Selections from good literature concerning rural life in summer are numerous. Only a few are here mentioned: The Farmer's Creed—Mann; The Pea Blossom—Anderson; A Song of Clover—Saxe Holm; Song of the Oriole—Howells; Blessing the Cornfield—Longfellow (Hiawatha); The Birds of Killingworth—Longfellow; A Day in June—Lowell.

Read also from suitable bulletins such as the following: Farmers' Buls. 113, The Apple and How to Grow It; 414, Corn Cultivation; 459, House Flies; 492, Insect Enemies of the Apple; 537, How to Grow an Acre of Corn.

The spelling lists for this season should cover the topics for summer work. The more advanced pupils should now spell correctly all ordinary agricultural terms.

Arithmetic.—Take up problems of plowing, harrowing, and planting. Find the cost of the crop up to this time including rent of land, fertilizer, seed, and labor. Numerous problems will arise in connection with the school and home gardens. The new flock of chickens will provide other problems. Make sure that each club member is keeping accurate accounts on each project and that each account is copied neatly for the report and booklet. In the apple club make accounts of the labor and material involved in pruning, spraying, cultivating, etc.

Geography.—Refer to bulletins and texts to find the origin of each of the common insect pests. How did they reach us? Notice how few appear to be native. Read in texts like Sanderson's Insect Pests of Farm, Orchard, and Garden. Do the same thing with weeds. Collect pictures of farm operations in foreign lands. Look up the location of canning factories for fruits and vegetables as sold in the local market. Locate these places on the map and consider the possibility of supplying the local market through the work of club members. Can these crops be raised and canned at a cost which will meet the competition of the factories? How about quality?

History.—Develop the history of methods of plowing, cultivating, and harvesting; the improvement of hand tools, followed by the substitution of machines. Refer to books on inventions and those on the industries. Show how much this development has meant to the country and how it has modified not only the method of work but also the distribution of crop acreage and the types of farming used. The story of the domestication of animals is a topic of interest. Davenport's Domesticated Animals and Plants will help.

Drawing.—Sketch apple blossoms in different stages, indicating at what stage to spray effectively. Sketch a codling moth. Draw parts of improved machinery and apparatus used. Complete the details in maps of gardens or farms as now being cultivated.

Physiology.—Take up the first aid in summer emergencies on the farm. Teach how to deal with ivy poison and other similar troubles the pupils may encounter. Use Farmers' Buls. 375, 459, and 540. Make a study of stable practice to control flies. Study the summer care of foods to prevent contamination and bacterial growth. (See Brewer's Rural Hygiene.)

Manual training.—Most of the manual work at this season should be done on the fields and gardens. If time permits it would also be well to make a fireless cooker and demonstrate its use. The girls should also have enough practice in the technique of canning to make sure they can do that part of the summer club work successfully. Complete all booklets as far as the progress of the club work will permit. Those which are complete may be bound with ribbon, cord, or metal fasteners.

CORRELATION SUPPLEMENTS.

I. THE SCHOOL EXHIBIT.

School exhibits or fairs of various kinds prove an incentive to pupils and compel the attention of the patrons of the school. The exhibit may not be an index of the quality of the school work, but an occasional exhibit of merit wins the recognition of the public and consequently at least a temporary interest in the work of the school. Of the possible exhibits related to agriculture the following may be mentioned:

(*a*) The school-garden fair. Produce of the school garden is suitably arranged for inspection and perhaps in competition. (*b*) Vegetables and flowers raised by pupils at home entered for school competition only. This may be at any convenient date. (*c*) A preliminary exhibit of pupils' produce when a part at least is to be exhibited in a county or other fair. This exhibit must necessarily be held early and extreme care must be used not to damage the specimens. (*d*) An exhibit where the pupils select the best they can find on the home farm and exhibit for the sake of illustrating the best. This is of value in communities where there is no regular agricultural fair. (*e*) Contests involving skill and judgment, such as corn judging, corn racking, etc. See Circ. 104 of the Bureau of Plant Industry, United States Department of Agriculture, Special Contests for Corn-club Work. (Fig. 5.)

In each exhibit or contest it is essential to have competent and impartial judges. The use of prizes should be judicious. Prizes of an agricultural nature are better than money, and in most cases ribbons or badges will serve as well. The cooking, canning, and sewing exhibits of the girls should be held at the same time, unless there is good reason for holding a separate exhibit. Have a poultry show in the early winter.

The exhibit and contest may be used to raise funds for some school improvement, and an auction sale of exhibits may be favored. In any case these events should make the school a real community center. The initiative and artistic taste of the pupils may be used in such a way as to minimize the work for the teacher.

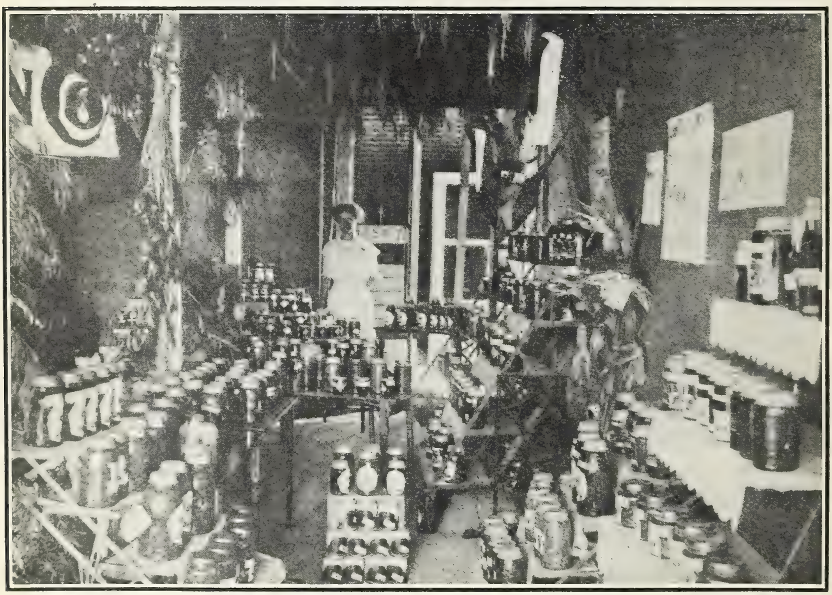

FIG. 5.—Pupils may make exhibit stands for a rural school.

The local or county superintendent of schools and the county extension representative of the college of agriculture usually stand ready to assist a teacher in all such matters. This cooperation will also give sanction to the affair and modify the attitude of some parents.

II. SEED SELECTING.

Corn taken as a sample will illustrate method for other plants. Plants that are nearly ideal in form, size, and vigor which yield abundantly are liable to produce seeds which will reproduce these qualities. Selection of seeds from such plants in the field will, if persisted in for several years, improve the quality of the variety. Those qualities most desired may be increased by this means, while careless seed selection may have the opposite result. Crops are often doubled merely by careful selecting, curing, and testing of seeds.

(*a*) Select and mark before maturity more plants than is thought necessary. (*b*) Select from early maturing plants more seed than is needed. (*c*) Cure thoroughly, store safely in a dry place. (*d*) Test before planting season and discard ears or plants having low percentage germination. Refer to the instructions forwarded from United States Department of Agriculture through club leader in the State, also Farmers' Buls. 537, How to Grow an Acre of Corn, and 617, School Lessons on Corn.

III. SEED CURING AND STORING.

The importance of this is not generally appreciated in the North. In New England and northern New York to North Dakota not only do killing frosts come early in September in some years, but a freeze heavy enough to destroy the vitality of poorly dried seed is almost sure to come early in October. Seed corn at harvest time contains from 20 to 50 per cent water, and in case of freezing this water expands and destroys germination cells. The same water might, under other conditions, favor the heating or molding of the seed. For these and other reasons early selection and careful curing are very advisable.[1] (See Farmers' Bul. 537 and Bureau of Plant Industry Circ. 104.)

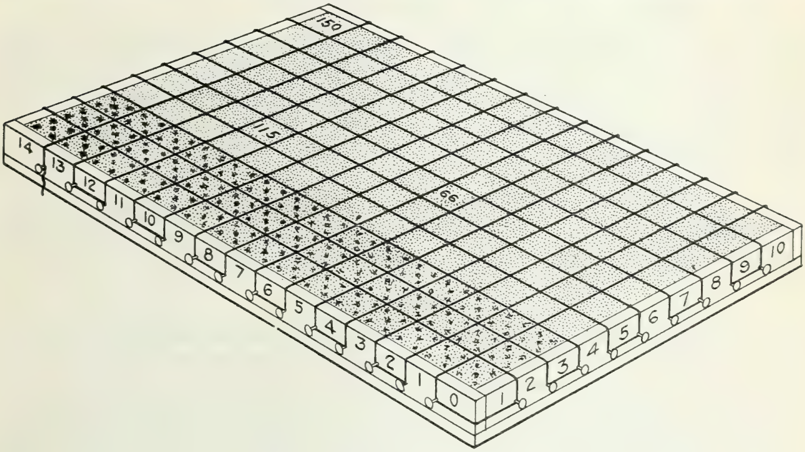

FIG. 6.—Sand tray for testing seed corn.

In storing remember (*a*) to keep seeds safe from mice and insects; (*b*) to keep dry, lest moisture absorbed cause premature sprouting or molding; and (*c*) to keep from excessive cold, as the moisture is never entirely dried out the first season.

Have drying and storing contrivances shown and their use demonstrated at school. Refer to Farmers' Buls. 229, 253, 313, 537, and 617.

IV. SEED TESTING.

In nearly all texts, manuals, and bulletins dealing with seeds the methods of testing seeds are explained and illustrated. This should come in late winter or early spring. Make it clear to pupils that two ears of corn may look equally good, and while one proves perfect in germinating power the other may show but a small percentage. Illustrate also the waste from low vitality in seeds which germinate but start too slowly. (Fig. 6.)

Illustrate different methods in school and use the sprouted seeds for related nature study. Continue some seedlings for further observation of cotyledons, leaves, etc.

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[1] In 1914 a frost occurred as far south as Maryland, on September 14, which was severe enough in some places to damage immature seeds. Hence the same practice is advisable throughout the whole section and is imperative with late varieties.

Use corn, grain, and garden seeds. Rectangular box tester has its advantages, while the cloth roll is easily carried. Illustrate both. Detect weed seeds in small seeds. References—Bureau of Plant Industry Doc. 803 and Circ. 104; Farmers' Bul. 428.

V. PERMANENT EXHIBITS.

The limit to the extent of these exhibits lies in the space and protection possible. Insects, dust, mice, and careless children should be provided against at the outset lest discouragements follow. See Farmers' Buls. 586, plant-material exhibits; 606, insects, rocks, soils, etc.; 617, School Lessons on Corn.

Charts may be made of surveys of the district covering club interests, animals, crops, birds, etc. Charts in the form of maps of the district make graphic exhibits of local conditions. Colored seals may be used as indicators.

Pictures of famous or ideal animals, of typical plants and fruit, of model structures and equipment may be procured from periodicals. If they are mounted and filed away from the dust and sunlight, they will prove valuable in teaching.

VI. GARDEN PLANS.

The home or the school garden needs careful planning during the latter part of the winter. The success of the garden as well as its attractiveness may be insured by careful planning at an early date. What to plant must be first decided and then a chart arranged to scale having in mind area, sunlight, buildings, varieties, successions, and the possibility of horse cultivation. Beauty is possible even in the vegetable garden.

In the school garden make individual plats run so that summer cultivation may run through the whole area. If any demonstration is attempted, get the cooperation of some farmers. (See Farmers' Buls. 154, 220, 254, and 255.)

VII. A DISTRICT SURVEY.

A district survey may be similar to a census, but the aim should be to learn more about the community and to obtain interesting material for school work. Eventually the district will profit by these surveys. Take up but few points for one investigation, ask the pupils to cover definite portions of the district faithfully, and after the data are collected tabulate and compute interesting results. Whenever this material can well be shown on the map make such a survey map of the district to file with the tabulated chart. Where any valuable conclusions can be drawn allow them to be made public unless ill feeling may be caused. Keep charts covering the club work constantly up to date. These charts will vary much in character in different localities, but the samples here given will illustrate the idea. Along some lines a township, county, or State survey chart may be of value. Obtain heavy paper for survey, similar to manila paper used to wrap tobacco or heavy merchandise. The size should be 18 by 24 inches or larger. Make maps of district this size also for survey work. Sample survey forms are here given.

DISTRICT CORN SURVEY FOR SEPTEMBER.

Year............

(Other crop surveys may be made with modifications of this form.)

District.............................. Teacher..............................
Township.............................. Pupils' survey committee.............
County and State...................... ....
....

No.	Name of farmer.	Location.	Acres in farm.	Acres of corn.	Yield.	Yield per acre.	Variety.	Acres of silage.	Seed selection.
1......	....	....	....	....	....	....	....	....	....
2......	....	....	....	....	....	....	....	....	....
3......	....	....	....	....	....	....	....	....	....
Etc....	....	....	....	....	....	....	....	....	....

DAIRY COW SURVEY OF DISTRICT.

Date............

(Other animal surveys may be made with modifications of this form.)

District..............................
Township..............................
County and State.....................
....

Teacher.................................
Pupils' survey committee.............
....
....

No.	Farmer.	Location.	Number of cows.	Breed.	Pure or grade.	Average value.	Average weight of milk.	Disposal of milk.	Test milk.	Balanced rations.
1										
2										
3										
Etc.										

A DISTRICT ORCHARD SURVEY.

Date............

District..............................
Township..............................
County..................................
....

Teacher.................................
Pupils' survey committee.............
....
....

Farmer.	Area of orchard.	Number of trees.	Age of trees.	Condition.	Last crop.	Price.	Value of crop.	Actual sales.	Spraying.	Labor, etc.	Net income.

VIII. THE BOOKLET.

Each contest or project in the club work calls for a booklet which shall include a description of every phase of the work, a plan of the field or diagrams of equipment, drawings which illustrate material, process or products, and everything of interest relating to the project.

The paper should preferably be suited to ink and drawings may be inserted on drawing paper. The size of the sheet should not be so small as to cramp the writing and drawings. The covers may be of bristol board or other types of board used for mounts. If the surface is reasonably smooth cover drawings may be made directly on it; in other cases a drawing or photograph may be mounted as a part of the cover design. These drawings often furnish the best type of work for the drawing class, and the work of mounting pictures, binding with ribbon, cord, or metal fasteners gives opportunity to develop artistic taste. The booklet may be easily correlated with language, arithmetic, geography, and history.

The literature furnished by the State leader of club work or county superintendent may suggest various booklets.

IX. THE SCHOOL LIBRARY.

At little or no expense much valuable agricultural literature may be added to the school library.

From the United States Government:

1. The list of available Farmers' Bulletins will be sent as often as issued to the school address. Apply to the Editor and Chief, Division of Publications, United States Department of Agriculture, Washington, D. C. He will also send regularly

the Monthly List of Publications if requested. This gives information as to new publications.

2. So long as the supply lasts, Farmers' Bulletins may be had free from any Congressman or from the United States Department of Agriculture direct.

3. The Superintendent of Documents, Government Printing Office, Washington, D. C., will furnish free the price lists for Government publications on various topics, including agriculture. Many of these are sold at a purely nominal price, but it rarely ever pays to purchase those of a technical nature.

The State agricultural college and experiment station should furnish you free—

4. A list of available publications.

5. Copies of popular and extension bulletins dealing with subjects of local and State interest.

6. The State club leader or county superintendent should furnish copies of printed and multigraphed information sent out through the extension service of the college of agriculture.

7. Cattle registry associations publish bulletins or booklets on particular breeds. Manufacturers of farm machinery and fertilizer companies often issue valuable booklets, and these are usually free on request.

8. Farm papers and magazines often give special inducements to schools. In other cases these may be brought from homes after they have been read there.

9. The teacher should seek competent advice before purchasing books, as the limited funds should be made to cover the most valuable books first.

10. Filing boxes for bulletins may be made by remodeling pasteboard boxes and reinforcing the corners and backs. Arrange either by subjects or numerically in sets, using an index. Arrange photographs or other illustrations in a similar way.

Have the pupils individually write requests for such material as is needed in duplicate for class use. For library purposes use the name of the school or office rather than a person's name for the mailing list.

X. AVERAGE FOOD COMPOSITION OF SOME CLUB PRODUCE.[1]

Kind of food materials.	Refuse.	Water.	Total indigestible nutrients.	Digestible nutrients.				Fuel value per pound.	Nutritive ratio.
				Protein.	Fat.	Carbohydrates.	Ash.		
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*	*1:*
Poultry, fowls	25.9	47.1	1.2	13.3	11.7	....	0.5	765	2
Eggs, uncooked	11.2	65.5	1.1	12.7	8.8	....	.7	635	1.7
Whole milk	....	87.0	.5	3.2	3.8	5.0	.5	310	4.3
Butter	....	11.0	4.9	1.0	80.8	....	2.3	3,410	....
Corn meal	....	12.5	3.3	7.8	1.7	73.9	.8	1,640	10.0
White wheat bread	....	35.3	2.9	7.8	1.2	52.0	.8	1,200	7.0
Beans, white, dried	....	12.6	7.9	17.5	1.6	57.8	2.6	1,520	3.5
Potatoes	20.0	62.6	1.2	1.5	.1	14.0	.6	295	9.5
Tomatoes	....	94.3	.5	.7	.4	3.7	.4	95	6.6
Apples	25.0	63.3	1.2	.3	.3	9.7	.2	190	34.7

[1] Based upon Farmers' Bul. 142. Consult also Farmers' Buls. 22, 121, 182, 183, 249, 293, 295, 359, 363, 413, 535, 565.

XI. SPELLING SUPPLEMENT.

A county superintendent found that none of the textbooks in spelling used in his county contained any of the following list of words used in the rural school agriculture. Each teacher should compile his own list.

Elementary agriculture: Rootstock, fertilizer, nitrogen, tillage, fungous, fungicide, insect, ration, scion, osmosis, bacteria, silage, environment, grasshopper, onion, parasite, vegetable, tubercles, propagation, codling moth, weevil, alfalfa, legumes, biennials, pollination, hybrids, cankerworm, girdler, irrigation, horticulture, stigma, pigweed, perennials, Bordeaux, shredder, bulletin, Clydesdale, Guernsey, aphis, formalin, maize, nutritious, experiment, Aberdeen, bacillus, bindweed, dandelion, cockroach, burdock, laurel, sumac, hackney, Wyandotte, gallfly, cocklebur, ladybird, purslane, Percheron, Galloway, Plymouth Rock.

Home economics: Materials, basting, napery, overseaming, percales, muslin, stitching, overcasting, embroidery, dimities, cashmere, taffeta, digestible, tablespoonful, recipes, serviceable, fabrics, cupfuls, croquettes, proteids, albumin, gelatinous, pasteurize, utensils, preservative, ingredients, chocolate, sterilize, putrefaction, cinnamon, chemistry, economy, rhubarb, carbohydrates, ginghams, beverages, coagulation, braising, nitrogenous, cheviot.

XII. ADDRESS LIST OF STATE INSTITUTIONS AND OFFICERS IN CHARGE OF AGRICULTURAL EXTENSION WORK UNDER THE SMITH-LEVER ACT.

Northern and Western States, 1915.

Institution.	Officer.
Col. of Agr., Univ. of Ariz., Tucson, Ariz	S. F. Morse, Supt. of Ext.
Col. of Agr., Univ. of Cal., Berkeley, Cal	Warren T. Clarke, Prof. Agr. Ext.
State Agr. College of Colo., Fort Collins, Colo	C. A. Lory, Act. Dir. Ext. Serv.
Connecticut Agr. College, Storrs, Conn	H. J. Baker, Dir. Ext. Serv.
Delaware College, Newark, Del	H. Hayward, Dir. Ext. Serv.
Col. of Agr., Univ. of Idaho, Boise, Idaho	O. D. Center, Dir. Ext. Work.
Col. of Agr., Univ. of Ill., Urbana, Ill	W. F. Handschin, V. Dir. Agr. Ext.
Purdue University, La Fayette, Ind	G. I. Christie, Supt. Agr. Ext.
Iowa State College, Ames, Iowa	R. K. Bliss, Dir. Ext.
Kansas State Agr. Col., Manhattan, Kans	J. H. Miller, Dean Div. Col. Ext.
Col. of Agr., Univ. of Maine, Orono, Me	L. S. Merrill, Dir. Agr. Ext.
Massachusetts Agr. College, Amherst, Mass	W. D. Hurd, Dir. of Ext. Serv.
Michigan Agr. College, East Lansing, Mich	R. J. Baldwin, Supt. of Ext.
Col. of Agr., Univ. of Minn., Univ. Farm, St. Paul, Minn	A. D. Wilson, Dir. Ext. and F. I.
Col. of Agr., Univ. of Missouri, Columbia, Mo	A. J. Meyer, Sec'y of Agr. Ext.
Montana State College, Bozeman, Mont	F. S. Cooley, Dir. Ext. Serv.
Col. of Agr., Univ. of Nebr., Lincoln, Nebr	C. W. Pugsley, Dir. Agr. Ext. Serv.
Col. of Agr., Univ. of Nevada, Reno, Nev	C. S. Knight, Dir. Agr. Ext.
N. H. Col. of A. and M. Arts, Durham, N. H	J. C. Kendall, Dir. Ext. Work.
Rutgers Scientific School, New Brunswick, N. J	Alva Agee, Dir. Div. of Ext.
N. Mex. Col. of A. and M. Arts, State College, N. Mex	A. C. Cooley, Dir. Ext. Work.
N. Y. State College of Agr., Ithaca, N. Y	B. T. Galloway, Dir. Div. Ext.
N. Dak. Agr. College, Agricultural College, N. Dak	T. P. Cooper, Dir. Ext. Work.
Col. of Agr., Ohio State Univ., Columbus, Ohio	H. C. Price, Dir. Agr. Ext. Work.
Oregon State Agr. College, Corvallis, Oreg	R. D. Hetzel, Dir. Ext. Work.
Pennsylvania State College, State College, Pa	M. S. McDowell, Dir. Agr. Ext. Work.
Rhode Island State College, Kingston, R. I	A. E. Stene, Dir. Ext. Serv.
S. Dak. State College, Brookings, S. Dak	E. C. Perisho, Act. Dir. Ext.
Agr. College of Utah, Logan, Utah	E. G. Peterson, Dir. Agr. Ext. Div.
Col. of Agr., Univ. of Vermont, Burlington, Vt	Thos. Bradlee, Dir. Ext. Serv.
State College of Washington, Pullman, Wash	J. A. Tormey, Dir. Ext. Div.
Col. of Agr., Univ. of Wis., Madison, Wis	K. L. Hatch, Asst. Dir. Agr. Ext.
Col. of Agr., Univ. of Wyo., Laramie, Wyo	A. E. Bowman, Dir. Ext. Work.

XIII. SUGGESTIVE PROBLEMS IN ARITHMETIC.

The teacher should adapt the problems to the advancement and current topics in arithmetic for the class in question. On the other hand, the numbers to be used as well as the subject matter may be found in the projects of the pupils or in the reference readings on these projects.

New textbooks are constantly appearing which contain agricultural problems, and among those now in print are Burkett and Swartzel's Farm Arithmetic, Calfee's Rural Arithmetic, and Nolan's One Hundred Lessons in Agriculture.

SEPTEMBER.

1. Have the pupils prepare a few poles or other measures a rod long and mark off yards and feet on each. Measure the school garden and the school yard and compute the area of each.

2. Use these poles or lines to measure the fields of club members, computing the area of each.

3. On a field of corn used for seed selection, measure off two average yield areas exactly a rod square. Count the stalks on these areas and compute the stand per acre. Also count ears of corn.

4. On a plat of tomatoes (one-tenth of an acre) the rental was $2, labor $4.50, staking and pruning $2, fertilizer $2.50, harvesting $2. One hundred dozen cans at 36 cents a dozen were used. The canner cost $5 and the cost of labor for canning was $10. The output of 1,200 cans sold at 8 cents a can. Find cost of production, total cost in cans, profit, percentage of profit based on investment, and profit per can.

5. A round silo has an inside diameter of 14 feet and is filled to the height of 32 feet. Find volume in cubic feet and weight of silage in tons if each cubic foot weighs 38 pounds. How many days' feed will it hold at 35 pounds a day for each cow, and how many cows will it feed for 180 days?

OCTOBER.

1. The floor plan of a club member's poultry house measures 20 feet long by 14 feet wide. Deduct 112 square feet for equipment and find the floor space per hen for a flock of 32.

2. This same house has a shed roof and stands 8 feet high in front and 5 feet at the rear. Compute the area of each side and end, also of the roof, allowing an extension of 1 foot on front and back over the walls. Compute boards for sides, roof, and floor, add one-half to cover the frame timber, and then make out a bill at the local prices.

3. Similar problems may be arranged concerning a hog house whenever pig-club members are in the class.

4. On a club acre 6,125 pounds of ear corn is harvested which has 18 per cent to be deducted. Compute bushels of ear corn, 70 pounds a bushel. When shelled each bushel weighs 56 pounds, what percentage of the ear corn is cob? Find value of this yield at 68 cents a bushel.

5. Farmers' Bul. 409, page 11, states that when $10 worth of corn is sold off the farm $3.78 worth of fertilizer is sold, but in selling $10 worth of beef cattle only $1.18 worth of fertilizer is sold. Compute the saving by turning the corn crop of problem 4 into beef, allowing for no other change of values.

6. In one feeding experiment it took 6 pounds of corn to produce 1 pound gain of pork. At the present market prices would this pay? What percentage of gain or loss if the corn were bought?

NOVEMBER.

1. A pen of 25 hens costing 55 cents each lay an average of 117 eggs a year, valued at 19 cents a dozen. Care and feed costs 21 cents per month each hen. Find net profit for the flock, allowing 50 cents for meat value of each hen at the end of the year.

2. By substituting pure-bred hens at $1 each and increasing the feed cost 6 cents each per month, 186 eggs per hen were obtained, averaging 28 cents a dozen. Find the total gain and the percentage profit on added investment over problem 1.

3. A pupil sets an orchard of apple trees on a square acre, trees to be set 2 rods apart each way and none to be nearer than 1 rod to either boundary. Find cost if trees sell at $22 a hundred and labor is 9 cents a tree.

4. An older orchard of the same area is sprayed with lime-sulphur in November for San José scale at a cost of 28 cents a tree. The apparent gain next fall is an increase of 45 bushels of marketable fruit at $4.50 a barrel. Find net gain due to spraying.

5. A mixture of 200 pounds of cracked corn, 360 pounds of wheat, 130 pounds of oats, is fed to a flock of 35 hens at the rate of 4 pounds a day. At local prices compute cost per hen per day for this scratch feed.

DECEMBER.

1. While judging corn count the kernels on each row of the best ear found. If by improvement one kernel could be added to each row, what percentage of increase would this give?

2. If but 80 per cent of the seed of this best ear would germinate, what loss would result, supposing each kernel should yield an ear and 85 ears to make a bushel, corn selling at 72 cents a bushel?

3. What loss at this rate on an acre which would have produced 95 bushels from good seed?

4. A cow produced in one year 8,465 pounds of milk containing 421 pounds of butter fat. Find the percentage of butter fat.

5. In the stomach of one woodpecker 28 white grubs were found. If the bird had continued to eat this number each day for the month of October, compute the value of the bird in a potato field, assuming that each grub would have ruined one 4-ounce potato. Call potatoes 50 cents a bushel.

6. A quail in December was known to consume for one day over 2,000 May weed seeds. Estimate that each 10 weed seeds might have cost one ear of corn the next year and that 85 ears make a bushel. Compute the loss prevented by 10 quails at this rate during the entire month of December.

JANUARY.

1. A club member reports the average daily milk production of his father's cows as 11, 13, 17, 20, 26, and 30 pounds. What is the total for each cow for 300 days? At $2.10 per hundredweight compare the best cow with the poorest.

2. The milk for the same cows as tested for butter fat by the boy shows 4.9, 4.1, 5.1, 3.8, 3.4, and 3.6 per cent, respectively. Find total butter fat for each cow and value at an average of 27 cents a pound for the year.

3. Because of these tests, cows Nos. 1, 2, and 4 are sold and new cows bought producing 24, 29, and 34½ pounds of milk, testing 5.2, 4.7, and 3.5 per cent butter fat, respectively. Find apparent yearly gain due to this exchange, butter fat being worth 27 cents a pound.

4. By using more care in feeding the same herd a ration costing but two cents a day more per cow results in an average increase of 4 pounds of milk a day. What profit results during a year?

5. During a State test for one year the Holsteins averaged 14,688.8 pounds testing 3.42 per cent, the Guernseys 8,465.4 pounds testing 4.98, and the Jerseys 7,046.7 pounds testing 5.16. Find annual value for each breed of market milk at $1.40 per hundredweight, also of butter fat at 25 cents a pound.

6. At what price per hundredweight must milk testing 4.9 per cent be sold to equal 27 cents for butter fat, allowing 30 cents per hundredweight for skim milk?

FEBRUARY.

1. Find the percentage of loss occasioned by putting one poor egg in a 5-dozen case and having them rated as seconds at 29 cents instead of firsts at 35 cents a dozen.

2. By testing a 30-dozen case of eggs and discarding six eggs a boy received 5 cents a dozen more on what remained. This was a 20 per cent gain on those sold. Find total receipts.

3. About 15,000,000 bushels of seed corn are used in this country, of which 86.3 per cent is good. How many bushels should be rejected for better?

4. It has been estimated that the rejection of the poor seed would have increased the average yield 298,140,695 bushels, or 13.7 per cent. Find the average yield.

5. A girl is to raise one-eighth of an acre of tomatoes and will use a part of a field which is 15 feet wide. How long a strip will she use? How many plants can she set 3 feet apart each way?

6. Refer to Farmers' Bul. 22 and compute from the local feeds available a good ration for a 1,000-pound cow producing 22 pounds of milk. At the current prices compute the cost of this ration.

MARCH.

1. A farm of 125 acres is valued at $16,000 in a township where taxes are $1.50 on $100 and interest on good security is 5 per cent. What minimum rent on a club acre would be necessary to cover interest and taxes?

2. Compute the number of hills in an acre of corn planted according to club directions. If there are 1,400 kernels of corn in a pound, how many pounds will be needed to plant the club acre, if it is tested well?

3. An average of two and one-half hours a tree, at 25 cents an hour, is spent in pruning 37 trees. How many more apples at $3.50 a barrel will be needed to pay for this work?

4. If it costs 9 cents extra per dozen to trap-nest eggs for setting, what percentage of extra profit is there in selling setting eggs at $2 per 15 eggs instead of at 30 cents a dozen for market?

5. Make out a bill of lumber for a cold frame to be covered by two 3-foot by 6-foot sash, the walls to be boarded 2½ feet on the north side and 2 feet on the south. Add 20 per cent for waste; bill lumber at $30 per M, and allow 12 cents for nails and $1.90 each for sash. Receipt the bill properly.

6. How many tomato plants may be started in the cold frame in problem 5, allowing 2½ inches each way for each plant?

APRIL.

1. A club member pays $7.20 for seed potatoes for his half-acre, $18 for fertilizer, 54 cents for plowing, $2.16 for planting, $1.44 for cultivating, $5.76 for spraying, $3.60 for harvesting and sacking. The yield is 91 bushels. It cost 7 cents a bushel to get them to market and the commission man returned to him 59 cents a bushel. Find the net profit.

2. How much would this boy have gained by selling direct to the retailer and dividing the middleman's profit? The retailer paid $1.25 a bushel.

3. Compare results on a half acre for early potatoes yielding 120 bushels an acre to sell at $1.30 as compared with late potatoes producing 185 bushels and selling at 55 cents. Are there other advantages in either plan?

4. A fertilizer formula, as 2 : 8 : 2 indicates the percentages of the entire weight available for plant use as nitrogen, phosphorus, and potash, respectively. Find how many pounds of each in 1 ton (2,000 pounds) of fertilizer with the above formula.

5. When nitrogen is worth 15 cents a pound, phosphorus 4 cents, and potash 7 cents, find the fertilizing value of 1 ton of 2 : 8 : 4.

6. Much of the nitrogen can be provided by crops like clover and alfalfa. What is the money saving per ton on each per cent of nitrogen thus saved? What gain when 2 per cent extra nitrogen on 1 ton fertilizer increases the yield of timothy hay one-half ton? Use local prices. (Use Farmers' Bul. 44.)

MAY AND JUNE.

1. Arsenate of lead costing 17 cents a pound is suspended in water, about 5 pounds in 50 gallons of water. If a 50-gallon tank full will spray 9 trees at a cost of 40 cents for labor, how much will it cost to spray three times an orchard of 25 trees?

2. Bordeaux mixture consisting of 6 pounds of copper sulphate at 8 cents a pound and 4 pounds of lime at 1 cent a pound in each 50 gallons of water is used to spray potatoes three times. If it takes 30 gallons for once over the field and the labor is 75 cents each time, find the cost of spraying.

3. The crop in the field in problem 2 was increased 63 bushels apparently because of spraying. What was net gain if potatoes sell at 55 cents a bushel?

4. One ton of clover contains 40.16 pounds of nitrogen, 11.2 pounds of phosphorus, and 36.6 pounds of potash. Find the fertilizing value of one-half ton plowed down on an acre. Use process given before.

5. A field drained at a cost of $150 gives an increased yield of 4 tons of hay, valued at $16.50 a ton, the first year. How many years at this rate will be needed to pay back the investment, paying 6 per cent interest at the same time?

XIV. SCORE CARDS TO ASSIST TEACHERS.

Many of the State colleges of agriculture through their extension service furnish to teachers a limited supply of score cards. In such cases the teachers should procure the blanks adapted to their States. The following scores were selected from those used in the Northern and Western States, and so far as possible the most common type was chosen. In case of diversity the card chosen was the most teachable form found. The teachers should use these more for standards of excellence in club work, but a limited number of judging exercises may be held on the crops or animals of local importance.

SCORE CARD FOR POTATOES.

Variety name .... Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Uniformity of exhibit	20	....	....
Trueness to type	10	....	....
Shape of tuber	15	....	....
Size of tuber, 4 to 8 ounces	15	....	....
Eyes, as affecting paring	5	....	....
Skin: Color, thickness, toughness	5	....	....
Texture of tuber	5	....	....
Soundness	10	....	....
Freedom from blemishes	15	....	....
Total	100	....	....

Remarks ....

Name of scorer .... Date ....

SCORE CARD FOR CORN.

Variety .... Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Maturity and seed condition To be of value for grain, corn *must* mature and produce good, hard seed.	25	....	....
Uniformity Ears should be alike in shape, size, color, indentation, and size of kernel.	15	....	....
Kernels Flat side, slightly wedge-shaped with large, smooth germ. Edge, with parallel sides and of medium thickness. Not chaffy.	15	....	....
Weight of ear Dent varieties, as usually planted, produce only one ear per stalk, hence yield per acre depends largely upon weight of shelled corn per ear.	15	....	....
Length and proportion Varies with locality and variety. Experiments show that a continued selection of short, thick ears reduces the yield.	10	....	....
Butts The base of the ear should be covered with even-sized kernels in straight rows which are a continuation of those at the center of the ear. The shank should be large enough to support the ear and no larger.	5	....	....
Tips Should be covered with kernels of the same depth as and in rows which are a continuation of those at the center of the ear.	5	....	....
Space between rows Should be very slight and in straight lines.	5	....	....
Color The color of both grain and cobs should be uniform, showing trueness to type or strain.	5	....	....
Total	100	....	....

Remarks ....

Name of scorer .... Date ....

SCORE CARD FOR VEGETABLES.

Vegetable.. Variety..........
Class.. Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Uniformity	20		
Symmetry	15		
Quality	15		
Texture	10		
Freedom from blemishes	15		
Commercial or table value	25		
Total	100		

Remarks..
Name of scorer.................................... Date ....

SCORE CARD FOR HOME GARDEN.

Garden No.................... Location....................................

Points.	Perfect.	Scorer's.	Corrected.
Location and soil[1]	5		
Number of varieties Reasonable range	10		
Garden plan	10		
Evidence of cultivation	20		
Tillage tools[1]	5		
Freedom from weeds	10		
Health of vegetables	15		
Yield, computed from fixed scale of values	25		
Total	100		

[1] With adults or older pupils having a choice in location and tools, these items are of more relative importance.

Remarks..
Name of scorer.................................... Date..................

SCORE CARD FOR TOMATO PLANT.

Variety.. Exhibit No. ....

Points.	Perfect.	Scorer's.	Corrected.
Form	10		
Vigor	25		
Foliage	10		
Product (quantity and quality)	35		
Disease (plant and product)	20		
Total	100		

Remarks..
Name of scorer.................................... Date..................

SCORE CARD FOR TOMATOES—PLATE.

Variety.. Exhibit No. ....

Points.	Perfect.	Scorer's.	Corrected.
Shape (should be ideal for variety)	15		
Blow or blossom end (small scar and smooth)	10		
Stem end (small, slight depression)	10		
Color (uniform and ideal for variety)	15		
Flesh (solidity)	10		
Flesh (uniform color)	10		
Even ripening for individual fruits	15		
Uniformity of sample	15		
Total	100		

Remarks..

Name of scorer.................................... Date..................

SCORE CARD FOR APPLES—BOX PACK.

Variety .... Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Fruit, 65 points:			
Texture and flavor	10		
Value of variety	10		
Size	10		
Color	10		
Uniformity	10		
Freedom from blemishes	15		
Package, 5 points:			
Material	3		
Marking	1		
Solidity, nailing, cleats, etc	1		
Packing, 30 points:			
Bulge or swell	5		
Alignment	4		
Height at ends	5		
Compactness	8		
Attractiveness or style of pack	8		
Total	100		

Remarks..

Name of scorer.................................... Date ....

SCORE CARD FOR APPLES—PLATE.

Variety... Exhibit No. ......

Point.	Perfect.	Scorer's.	Corrected.
Size (Normal: Neither too large nor too small)	10		
Color, typical	25		
Freedom from blemish	20		
Texture and flavor	20		
Uniformity and trueness to type	25		
Total	100		

Remarks..

Name of scorer.................................... Date ....

SCORE CARD FOR ALFALFA HAY.

Class .... Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Color: Bright green preferred; brown, in sweated sample not objected to	16		
Smell: Fresh, sweet, appetizing; free from mustiness	20		
Fineness of stem	8		
Softness of stem: Pliant, not harsh or brittle	8		
Percentage and condition of leaf	14		
Purity: Proportion of alfalfa as compared with grasses, etc	8		
Cleanness: Freedom from dust, molds, objectionable weeds, etc	18		
Weight and general makeup for market	8		
Total	100		

Remarks ....

Name of scorer ....

SCORE CARD FOR DAIRY CATTLE.

Breed .... Name .... Register No. ....

General appearance.—A dairy cow should weigh not less than 800 pounds, have large capacity for feed, a dairy temperament, well developed milk organs, fine quality and perfect health, and be capable of a large production of milk and butter fat.

Points.	Perfect.	Scorer's.	Corrected.
Indication of capacity for feed, 25 points:			
Face, broad between the eyes and long; muzzle clean-cut; mouth large; lips strong; lower jaws lean and sinewy	5		
Body, wedge shape as viewed from front, side, and top; ribs long, far apart and well sprung; breast full and wide; flanks, deep and full	10		
Back, straight; chine, broad and open; loin, broad and roomy	5		
Hips and thurls, wide apart and high	5		
Indication of dairy temperament, 25 points:			
Head, clean-cut and fine in contour; eyes, prominent, full, and bright	3		
Neck, thin, long, neatly joined to head and shoulders, and free from throatiness and dewlap	4		
Brisket, lean and light	2		
Shoulders, lean, sloping, nicely laid up to body; points prominent; withers sharp	4		
Back, strong, prominent to tail head and open jointed	3		
Hips, prominent, sharp and level with back	3		
Thighs, thin and incurving	4		
Tail, fine and tapering	1		
Legs, straight; shank fine	1		
Indication of well-developed milk organs, 25 points:			
Rump, long, wide, and level; pelvis roomy	3		
Thighs, wide apart; twist, high and open	3		
Udder, large, pliable, extending well forward and high up behind; quarters, full, symmetrical, evenly joined, and well held up to body	15		
Teats, plumb, good size, symmetrical, and well placed	4		
Indications of strong circulatory system, health, vigor, and milk flow, 25 points:			
Eyes, bright and placid	2		
Nostrils, large and open	3		
Chest, roomy	5		
Skin, pliable; hair, fine and straight; secretions abundant in ear, on body, and at end of tail	7		
Veins, prominent on face and udder; mammary veins, large, long crooked, and branching; milk wells large and numerous	7		
Escutcheon, wide and extending high up	1		
Total	100		

Remarks ....

Name of scorer .... Date ....

SCORE CARD FOR SWINE.

Breed.......................... Name.................. Register No. ......

Points.	Perfect.	Scorer's.	Corrected.
General appearance, 25 points:			
Weight, ...; estimate, ...; actual pounds	6		
Form, deep, broad, low, long, symmetrical, compact, standing squarely on legs	8		
Quality, bone clean; hair, silky; skin, soft; head and ears, refined, evenly covered with firm flesh	6		
Disposition, quiet, docile	5		
Head and neck, 10 points:			
Snout, medium length, not coarse	1		
Face, short, cheeks full	1		
Forehead, broad	1		
Eyes, large, mild, full, bright, wide apart	1		
Ears, medium size, fine, soft	1		
Jowl, strong, neat, broad	2		
Neck, thick, medium length	3		
Fore quarters, 13 points:			
Shoulder, symmetrical, broad, deep, full, compact on top	6		
Breast, wide, prominent, well let down	2		
Legs, straight, short; feet and pasterns strong	5		
Body, 32 points:			
Chest, deep, broad; girth, large	7		
Sides, deep, lengthy, and full	8		
Back, broad, straight, thickly and evenly fleshed	7		
Loin, thick, wide, and strong	5		
Belly, straight, even, and firmly fleshed	3		
Flank, low and well fleshed; girth large	2		
Hind quarters, 20 points:			
Hips, wide apart, smooth	3		
Rump, long, wide, evenly fleshed, smooth	4		
Hams, firm, heavily fleshed, deep and wide	8		
Legs, straight, short; feet and pasterns strong	5		
Total	100		

Remarks..

Name of scorer.............................. Date......................

SCORE CARD FOR UTILITY POULTRY.

Variety.. Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
General appearance, 30 points:			
Weight, according to age	2		
Form long, moderately deep, broad, low set, conforming to breed type, top line and under line straight	8		
Condition, face and head appurtenances bright red, eye bright and full, feathers glossy, uniformly well fleshed throughout	6		
Style, active and vigorous, not restless, showing strong character	7		
Quality, bone moderately fine, feathers soft, skin and scales mellow, flesh fine texture, evenly distributed	7		
Head and neck, 20 points:			
Head short, broad between the eyes, neither coarse nor snaky in appearance	5		
Comb medium in size, bright in color, fine texture, and well attached	3		
Beak short, stout, broad at the base, well curved	3		
Eye clear and full	2		
Face short, full, with a clean-cut appearance	2		
Wattles and lobes medium in size, fine in texture and smooth	1		
Neck moderate in length, well joined to head and shoulders	4		
Body and legs, 50 points:			
Shoulders broad and rather flat on top	4		
Back broad, fair length, width well carried back	6		
Breast moderately deep and wide, full and round	10		
Keel well forward, long and straight, well covered with flesh throughout	12		
Tail well spread and full, no pinched effect	4		
Thighs medium length, plump	6		
Legs straight, fairly short, set well apart, strong but not coarse	8		
Total	100		

Remarks..

Name of scorer.............................. Date......................

SCORE CARD FOR MARKET EGGS.

Class.. Exhibit No. ......

Points.	Perfect.	Scorer's.	Corrected.
Shape: Uniformly oval, no ridges	10		
Color: Uniform over entire shell and throughout the dozen. Rich dark brown for brown, clear white for white	10		
Weight: For each ounce short of the grade standard cut one-half point	15		
Shell: Strong, not porous. Spotlessly clean and unsmeared or glossy by washing	15		
Quality: Fresh and sweet, full, clean viscous white, rich golden yolk that stands up	50		
Total	100		

Remarks...

Name of scorer.. Date....................

BUTTER SCORE CARD.

Breed of animal.................. Name.................. Register No......

Points.	Perfect.	Scorer's.	Corrected.	Defects.
Flavor	45			Metallic. Curdy. Fishy. Feverish. Oily. Weedy. Stable. Unclean. High acid. Low acid.
Texture	25			Poor grain. Weak body. Cloudy brine. Too much brine. Cheesy. Greasy. Tallowy.
Color	15			Mottles. White specks. Too high. Too light. Streaky.
Salt	10			Too much salt. Poor salt. Lacks salt. Gritty.
Condition of package	5			Dirty. Poorly packed. Poorly nailed. Poorly lined.
Total	100			

Remarks...

Name of scorer.. Date....................

SCORE CARD FOR WHITE BREAD.

Class of exhibit.................................... Exhibit No................

Points.	Perfect.	Scorer's.	Corrected.
General appearance (20 points):			
Size	5		
Shape	5		
Crust: Color Character Depth	10		
Flavor, odor, and taste	35		
Lightness	15		
Crumb (30 points):			
Texture: Fine—coarse Tender—tough Moist—dry Elastic or not	20		
Color	5		
Grain: Distribution of gas	5		
Total	100		

Remarks..

Name of scorer.................................... Date....................

The above score is explained by Miss Isabel Bevier in University of Illinois Bulletin 25, Vol. X.

Ten points are awarded at the New York State College of Agriculture for a written report which must accompany the loaf telling (*a*) brand of flour and kind of yeast used, (*b*) how mixed and set to rise; number of times set to rise, (*c*) time of baking and about what temperature, (*d*) care after baking, (*e*) number and value of hours of labor consumed, total cost of loaf, and the approximate number of loaves that could be made in the time taken in making one.

The 10 points for report may be taken by omitting size and counting lightness as 10 only.

SCORE CARD FOR CANNED FRUIT OR VEGETABLES.

Kind........................ Variety........................ Exhibit No......

Points.	Perfect.	Scorer's.	Corrected.
Flavor: The flavor should be agreeable and as nearly as possible that of the fresh, perfect fruit or vegetable	45		
Texture: Well cooked—so that it is tender, yet not overcooked	25		
Condition: Liquid clear. No sign of decomposition. Product should be uniform in size, well arranged in can, and of good color	10		
Purity: Free from foreign material, preservatives, or artificial color	10		
Package: Cans should be uniform and of quality, shape, and size practicable to the average home. The labels should be suitable, uniform, and neat	10		
Total	100		

Remarks..

Name of scorer.................................... Date....................

SCORE CARD FOR JELLY.

Kind .... Exhibit No......

Points.	Perfect.	Scorer's.	Corrected.
Color	10		
Transparency	20		
Taste, flavor, acidity, etc	25		
Consistency:			
Holds shape well, not flow	15		
Tender, will cut easily	15		
Firm angles, retain shape	5		
Freedom from crystallization	10		
Total	100		

Remarks...

Name of scorer.. Date..................